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SYNOPSIS OF THE NORTH AMERICAN SPECIES OF HYPOXYLON AND NUMMULARIA.

BY J. B. ELLIS AND B. M. EVERHART.

(Continued from page 44.)

III. Clitoxylon. Stroma pulvinate, more or less convex, but not effused.

a. Stroma externally colored, not black.

HYPOXYLON XANTHOCREAS, B. & C.—Grev. IV, p. 51. New England (Sprague); (*H. Peckianum*, Sacc. Syll. I, p. 360). On *Alnus*, N. Y. (Peck). "At first distinct, pulvinate, then by confluence forming a mass half an inch broad, black, papillate from the projection of the minute perithecia; asci linear; sporidia uniseriate, elliptic, .0003 of an inch long" (10 x 5 μ , Cke.)

Prof. Peck, in 31st Rep., p. 49, says; "Our specimens (on prostrate dead alders) agree with those received from Dr. Curtis under this name, but they do not agree with the description of the species as published in Grevillea. In our specimens the young plant is covered with a compact yellow conidiiferous stratum bearing elliptical conidia .00016'—.0002' long. As the stroma increases in size it becomes naked above and of a purple-brown or chestnut color which contrasts beautifully with the yellow margin. When old it becomes darker, but I have not seen it black as described. The surface is generally irregular or uneven. The stroma is whitish or pallid within, but near the surface it is yellow. The spores vary from .0004'—.0006' in length" (10—15 μ).

The specimens of this species in Rav. Car., V, No. 57, have the stroma 3—4 mm. broad, brown above with the margin and inside yellow; asci (p. sp.) about 60 x 6 μ , with a slender stipitate base of about the same length; sporidia uniseriate, elliptical, pale brown, 7—9 x 3—4 μ . There does not seem to be much doubt that the specimens found by Peck in New York are the genuine *H. xanthocreas*.

HYPOXYLON EPIPHLEUM, B. & C.—Grev., IV, p. 52. On *Magnolia glauca*. Carolina (Ravenel), N. J. (Ellis). The early conidial stage consists of small (1—2 mm.), thin patches of brick-red tomentum consisting of erect hyphæ suboppositely branched above and minutely roughened, bearing ovate, hyaline, 3—3½ x 2½ μ conidia. In the midst of these conidial patches soon appear small clusters of 3—12 perithecia ¾—1 mm. in diameter and either scattered or singly, more or less connate, the different groups or clusters more or less confluent but not continuous, covered at first with the brick-red conidial layer, then bare and black; asci cylindrical, 80 x 4½ μ (spore-bearing part about 60 μ long); sporidia uniseriate, navicular, deep brown, 7—8 x 3 μ . The perithecia have a distinct papilliform ostium.

HYPOXYLON SUBORBICULARE, Pk., 30th Rep., p. 63.—On bark of *Acer saccharinum*, New York (Peck). "Stroma thin, flattened, erumpent, surrounded by the ruptured epidermis, growing from the inner bark, purplish-brown, then black, the surface slightly uneven as if areolate-rimose; perithecia monostichous, subglobose; ostiola sunken, perforate, sometimes whitish; spores unequally elliptical, colored, .0004' —.0005' long." Mr. Peck considers this an ally of *H. Laschii*, Nits., but the thin stroma would remove it from this section. Placed by Cooke in *Nummularia*.

HYPOXYLON MORSEI, B. & C.—Grev. IV, p. 51. On *Alnus*. Maine (Blake); New Hampshire (Mrs. Harrison); New York (Peck). On *Pyrus malus*, *Carpinus* and *Betula*. Iowa (Holway) [*Fuckelia Morsei*, Cke., Grev., XIII, p. 108]. Stroma erumpent, orbicular, 3—5 mm. in diameter, closely embraced by the ruptured epidermis, flattened above, brownish-black and papillose from the prominent ostiola, surrounded by a black circumscribing line; perithecia large (about one mm.), submonostichous, mostly only slightly prominent, 4—15 in a stroma; asci linear-cylindrical, 110—120 x 12 μ ; sporidia uniseriate, oblong-elliptical, brown, 1—2-nucleate, 17—22 x 8—10 μ . The Iowa specimens on birch have the stroma elliptical and larger (1 x $\frac{1}{2}$ cm.) and the perithecia have a tendency to crack away from each other and separate. Sec. Cke., in Grev., *H. Blakei*, B. & C., is not distinct from this.

HYPOXYLON DECORTICATUM, Sch.—Syn. N. Am., No. 1179. On wood and bark, Bethlehem, Pa. (Schw.), New England (Torrey). Subpulvinate, flattened when on the wood, less so on the bark, surface rusty gray and densely covered with rough, sphaeriæform tubercles resembling ostiola so as to appear roughened with black granules; perithecia peripheric in several layers, ovate-globose, immersed in the dark rust-colored stroma; pulvinuli subrotund or irregular, about 5 mm. across, often confluent; sporidia (sec. Cke., in Grev., XI, p. 123) 12—14 x 4 μ .

HYPOXYLON PRUINATUM (Klotzsch).—*Sphaeria pruinata*, Kl., in Linnæa, 1833, p. 489; *Rosselinia pruinata* (Kl.) Sacc., Syll., I, p. 259. Perithecia globose, effused, conrescent, prominent, white-pruinose, black within; ostiola prominent, black; asci broad-cylindrical, briefly stipitate-spored; sporidia uniseriate, ellipsoid, 1—4-nucleate, 25 μ long. On the bark of trees. North America (Dr. Richardson).

HYPOXYLON HOLWAYI, Ell., in Am. Nat., February, 1883, p. 193.—On dead *Populus*, Iowa, July (Holway). Stroma $\frac{1}{4}$ — $\frac{1}{2}$ cm. in diameter, rather thin, orbicular, black within, surface covered with a white-pruinose coat except the projecting, acutely papillose black ostiola; perithecia in a single layer, 20—30 in each stroma; asci cylindrical; sporidia uniseriate, oblong, brown, 1—2-nucleate, 22—27 x 11 μ , resembling the spores of a *Sphaeropsis*. Surrounding the stroma and standing out obliquely like a coarse fringe are short, coarse, black bristle-like teeth like the teeth of a *Hydnum* or *Irpex*. This curious growth also arises from the surface of the inner bark for some distance around the stroma, soon throwing off

the epidermis and leaving the blackened surface of the inner bark exposed. This growth is analogous to that of *Institale acariforme*, Fr., in connection with *Hypoxyylon coccineum*. Sec. Cooke, in Grev., XIII, p. 15, this is the same as the preceding species (*H. pruinatum*). This is not improbable, as the only essential difference is in the coarse bristle-like teeth surrounding the stroma, a character possibly only accidental, as it was not seen on all the specimens.

b. Stroma externally black.

HYPOXYLON LEUCOCREAS, B. & Rav.—Grev., IV, p. 51. On limbs of oak. South Carolina (Ravenel). "Small, about $\frac{1}{2}$ a line across, black, papillate from the projection of the perithecia; stroma snow white; asci linear; sporidia in a single row, minute, elliptic, brown." Sporidia (sec. Cke., in Grev.) $5 \times 2\frac{1}{2}$ μ .

HYPOXYLON EXIGUUM, Cke.—Grev., XI, p. 130. On rotten wood, Alabama and Carolina, also in Mauritius. "Pulvinate, convex-applanate, black, oval or discoid (2—3 mm. broad), here and there confluent; perithecia minute, numerous, papillate; asci cylindrical; sporidia very minute, elliptic, dark, $3\frac{1}{2} \times 2$ μ . A most distinct species, easily recognized by the exceedingly minute sporidia, which are a little larger in the American specimens."

HYPOXYLON PALLIDUM, E. & E.—On bark of dead oak limbs, Catahoula, La. Langlois, No. 1273. Perithecia globose, about one mm. in diameter, suberose-coriaceous, connate in tuberculiform clusters, 2—5 mm. in diameter, of a coffee-brown color, smooth but uneven from the slightly projecting flattened apices of the perithecia, which have a small, black, papillose ostiolum, surrounded by a light-colored ring; stroma scarcely any except as formed by the connate walls of the perithecia; asci cylindrical, 150×6 μ , including the substipitate base, with abundant paraphyses; sporidia uniseriate, navicular, opaque, about 12×6 μ .

HYPOXYLON ANNULATUM (Schw.) Fr., in Fr. Elenchus, II, p. 64. On dead oak limbs and having about the same range as the preceding species (*H. marginatum*). Stroma hemispheric-tuberculiform (about $\frac{1}{2}$ cm. across) or irregularly effused and interruptedly confluent-tuberculose, purplish-black; perithecia subglobose, monostichous, large (1 mm.), from $\frac{1}{4}$ — $\frac{1}{2}$ of the upper part free, finally annulate-truncate above with the black papilliform ostiolum in the center of the truncate disk; asci narrow-cylindrical (p. sp.), 75×6 μ or including the slender base 100 — 112 μ long; sporidia oblong-navicular, uniseriate, brown, mostly 2-nucleate, 7 — $9 \times 3\frac{1}{2}$ μ , with their extremities rather more obtuse than in the preceding species. Var. *B. depressa*, Fr., l. c., appears to be the effused form above mentioned. This species is not mentioned in Schw. Syn. N. Am. It is readily distinguished from *H. marginatum* by its larger perithecia, much more prominent and sometimes nearly free, and its smaller, purplish-black stromata. No. 182 in Rav. F. Am. (in the copies we have seen) is *H. marginatum*.

HYPOXYLON MARGINATUM, Schw.—Syn. N. Am., No. 1176. On dead oak limbs and trunks; from Maine to Florida and west to Ohio. Stroma pulvinate, 1—3 cm. across or by confluence more than that, convex-hemispheric, covered at first with the olivaceous conidial layer, finally black, surface slightly roughened by the projecting perithecia with their black papilliform ostiola, which arise from the center of a small, flat, circular depression or disk which, however, does not appear in the earlier stage of growth; perithecia monostichous, peripheric, about two mm. in diameter, ovate; asci cylindrical, $75-80 \times 6-7 \mu$; sporidia uniseriate, navicular, brown, $7-9 \times 3-3\frac{1}{2} \mu$ (mostly $7-8 \mu$ long). This has been issued in Ravenel's Fungi, Car. Ex. Fasc., I, No. 47, and in Ellis' N. A. F., No. 471, as *Hypoxylon annulatum*, Schw., but it agrees with specimens of *Sphaeria marginata*, Schw., in Herb. Schw. at Philadelphia and also with the description of that species in Syn. N. Am. The *S. marginata*, Fr., in Fries' Elenchus, II, p. 69, is evidently a different thing—probably, as Saccardo (in Syll., I, No. 371) suggests, *Nummularia discreta* (Schw.)

HYPOXYLON DAVISSIMUM (Schw.) Syn. Car., No. 46.—“Effusa, irregularis, lignea, rubiginosa, intus nigra, peritheciis globosis immersoperiphericis.”

Cooke in Grev., XI, p. 131, considers this as a synonym of the preceding species (*H. marginatum*) which, as we have often seen in the Pennsylvania and New Jersey specimens, is often, at a certain stage of growth, of a dark rust color (“rubiginosa”).

HYPOXYLON POLYSPERMUM, Mont.—Syll. Crypt., No. 736. Sacc. Syll., I, p. 385; Exsic. Rav. F. Am., Nos. 346 and 347. On wood and bark of various deciduous trees, *Quercus*, *Myrica*, etc. Georgia (Ravenel) Florida and Tennessee (Calkins). Stroma effused, applanate, abruptly limited, of a purplish rust color, becoming black, outline irregular, mostly elongated ($1-3 \times 1$ cm.) and about 1 or $1\frac{1}{2}$ mm. thick, surface even or subtuberculose, closely papillate from the abundant ostiola, which are surrounded by an annular depressed area as in *H. marginatum* and *H. annulatum*, smaller, however, as well as the perithecia themselves than in either of these species; asci narrow-cylindrical, about $40 \times 4 \mu$ (p. sp.); sporidia oblong-elliptical, uniseriate, $4-5 \times 1\frac{1}{2}-2 \mu$, pale brown, sometimes a little bulging on one side; perithecia monostichous, $\frac{1}{2}$ mm. or less in diam. The general appearance is that of *H. rubiginosum*, from which as well as from the two above-named species it is distinguished by its much smaller sporidia. The specimens in Rav. F. Am. are labeled *H. marginatum*, Sz., but they cannot possibly be that species.

HYPOXYLON CALLOSTROMA, Schw.—Syn. N. Am. No. 1208. On wood and bark of *Laurus æstivalis*, Bethlehem, Pa. (Schweinitz). Irregularly effused, 2—3 inches long and wide, or in subturbinate groups of smaller size and seriatly arranged but not really confluent, in this case resembling *H. turbinulatum*. The effused specimens resemble at first sight some simple *Sphaeria* with large perithecia closely crowded

together, but a section shows that they are joined (below) in a common stroma which, on the outside, is black. The surface is uneven, granulose and punctate-rugose from the slightly prominent perithecia, which have their apices truncate with an obtusely subconic ostiolum immersed below in a grumose, bright ochraceous-red stroma of varying thicknesses. The perithecia themselves are oval or irregular in shape, consisting of an outer bark or shell enclosing the shining black ascigerous nucleus. The colored stroma is always present even when reduced to the simplest form enclosing but a single perithecium; sporidia $12 \times 5 \mu$ (sec. Cooke in Grev., XI, p. 125).

HYPOXYLON SMILACICOLUM, Howe.—Bull. Torr. Bot. Club, VI, p. 31. "Small, black, roundish or elliptical, irregular when confluent, pulvinate, perithecia subglobose; asci cylindrical or subclavate; spores brown, subcymbiform, $15-20 \times 7\frac{1}{2} \mu$, usually with several nuclei. On dead stems of *Smilax*. The spores are rarely elliptical at maturity but sometimes pointed at both extremities."

HYPOXYLON SASSAFRAS, Schw.—Syn. Car., No. 87. Perithecia large ($1\frac{1}{2}$ mm.), the internal cavity nearly one mm. in diameter, occurring either single and quite evenly scattered over the matrix or loosely aggregated in clusters or groups of 3—8 perithecia standing side by side, their bases united in a thin stroma of a dirty brownish-black outside and rusty yellow within, with $\frac{1}{4}-\frac{1}{2}$ their upper part free, subtruncate above with a minute papilliform ostiolum; asci, including the slender base, $110-120 \times 4 \mu$; sporidia uniseriate, oblong, pale brown, 1—2-nucleate, $7-9 \times 3 \mu$; paraphyses filiform, abundant. On dead limbs and trunks of *Sassafras* from New York to Florida and west to Ohio, mostly on the bark but also on the wood.

HYPOXYLON CULMORUM, Cke.—Grev., VII, p. 51. On dead culms of *Arundinaria*. Georgia (Ravenel), Florida (Calkins), Louisiana (Langlois). Stroma convex, 2—4 mm. across, olive-gray, then black, at first nearly even, then tuberculose from the projecting perithecia, finally deciduous, appearing first as olive-gray, appressed, thin, rather indefinitely limited patches 2—4 mm. across, consisting of closely packed-erect, subsimple, brownish hyphæ $15-20 \times 2-2\frac{1}{2} \mu$, bearing at their tips oblong or ovate-elliptical hyaline conidia $4-6 \times 2-2\frac{1}{2} \mu$. These patches soon become tuberculose from the scattered incipient perithecia (3—15 in number), soon enclosed in the dull black stroma, whose surface is tuberculose-roughened by their obtuse projecting apices. In the specimens in Rav. F. Am., 351, the perithecia are mostly solitary but still enclosed in a stroma more or less distinct. The inner cavity of the perithecia is $\frac{1}{3}-\frac{1}{2}$ mm. in diameter; asci subcylindrical, $75-85 \times 8-10 \mu$ (p. sp.) with a short stipitate base and with evanescent paraphyses; sporidia oblong-navicular or fusoid-navicular, mostly obliquely uniseriate, 2—5-nucleate, brown, $15-18 \times 6 \mu$. Resembles in some respects *H. Sassafras*, Schw.

(To be continued.)